

# APPENDIX A

## GENERAL STANDARD OPERATING PROCEDURES FOR SURFACE-DISTURBING ACTIVITIES

The following are general standard operating procedures applied to surface-disturbing activities. These measures are applied, when necessary, to reduce environmental impacts. Some projects may require construction and use plans (CUP) and/or erosion control revegetation and restoration plans (ERRPs). These situations will also require a site specific environmental analysis to address impacts and appropriate mitigation measures.

### HANDLING OF TOPSOIL AND SPOIL

Before a surface disturbing activity is authorized, the amount of topsoil to be removed and storage areas will be specified. The need to strip topsoil along buried pipelines, or other buried linear facilities, will be determined on a site specific basis. The general policy will be to strip topsoil unless it can be shown that the specific operations will not negatively impact soil compaction, stability, or fertility. Topsoil in excess of six inches may be stored, if it is available, so that it may be used offsite in areas that do not have adequate topsoil. Areas which have stored topsoil will be marked for use as borrow areas for other areas deficient in topsoil. Whenever possible, topsoil will be used for immediate reclamation. For topsoil stockpiles that are to be kept through the winter, erosion will be controlled by reducing the piles to less than 3 feet in height and by seeding and/or mulching them.

Topsoil stockpiles will be designed to maximize surface area to reduce impacts to soil microorganisms. All surface vegetation will be incorporated directly into the topsoil as organic matter and seed source unless brush is required to be handled separately.

For pipelines on slopes less than 10 percent, a minimum of six inches of topsoil will be stripped from the trench and spoil storage side and placed into a berm by side casting with a grader. For pipelines that are less than 9 inches in diameter, topsoil will not normally be stripped from the working side of the trench.

After the pipe is installed and the spoil material has been compacted back into the trench, topsoil will be

spread over the spoil storage and pit area, water bars installed, and reseeded. Care must be taken to not block drainage ditches.

For roads on slopes of less than 10%, available topsoil will be stripped from the construction area and placed in berms by sidecasting with a grader.

After access construction, the topsoil will then be spread back onto the road out slopes and cut slopes.

### CONSTRUCTION, MAINTENANCE AND RECLAMATION OF ROADS

Recognized roads, as shown on the Rock Springs District Office Transportation Plan, will be used when the alignment is acceptable for the proposed use. Generally, roads will be required to follow natural contours; be constructed in accordance with standards as described in BLM Road Standards and BLM Manual section 9113; and be reclaimed to BLM standards.

Access roads will be constructed to the standard necessary to accommodate their intended functions. All roads in the oil field will be treated as "all weather roads." Unless the road sub grade material has enough gravel in it as determined by the authorized officer (AO) all "all weather roads" will be graveled with 2 inch pit run or crushed gravel. All roads constructed by non-government entities across public lands must be designed by or under the direction of a licensed professional engineer. The engineer must certify that the road was built as designed. Soil compaction is required during road construction and culvert installation.

Authorized users are responsible for preventive and corrective road maintenance on all roads associated with field operations. This includes crowning, cleaning ditches and drainage facilities, culvert installation, graveling, dust abatement, or other requirements as directed by the AO.

Riprap will be required at the inlet and outlet of all culvert installations. The minimum size will be determined by the AO's representative.

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Surface runoff and sedimentation control will be incorporated in all access road design in accordance with BLM Manual 9113 guidelines and installed as approved by the A.O. Road grades, ditches, culverts, sediment traps,, material cut and fill, and topsoil and spoil areas will be designed and located in the field prior to construction.

Access road culvert location and spacing will be approved by the AO using BLM Road Standards Manual 9113 Illustration 9 "Recommended Spacing for Lateral Drainage Culverts in Various Soil Types", shown below. The culvert spacing shown in feet under the erosion index of 10 to 40 will be used.

### Spacing for Drainage Laterals Recommended Spacing for Lateral Drainage Culverts in Various Soil Types\*

Soil Types	EROSION INDEX			
	10	20	30	40
Silty sands, sand-silt mixtures, inorganic silts and very fine sands, silty or clayey fine sands	X—— X			
Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts, organic silts and organic silty clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	X—— X			

\*Unified Soil Classification

Road Gradient in percent	Erosion Index			
	10	20	30	40
2	900'	1225'		
3	600'	815'	1070'	1205'
4	450'	610'	800'	905'
5	360'	490'	640'	725'
6	300'	410'	535'	605'
7	255'	350'	455'	515'
8	225'	305'	400'	450'

To control or reduce sediment from roads, guidance involving proper road placement and buffer strips to stream channels, graveling, proper drainage, seasonal closure, and in some cases, redesign or closure of old roads will be developed when necessary.

On newly constructed roads and permanent roads, the placement of topsoil, seeding, and stabilization will be required on all cut and fill slopes unless conditions prohibit this (e.g., rock). No unnecessary side-casting of material (e.g., maintenance) on steep slopes will be allowed.

Snow removal plans may be required for access which have winter use so that snow removal does not adversely affect drainage systems, reclamation efforts or other resources adjacent to the road.

Reclamation of abandoned roads will include reshaping, recontouring, resurfacing with topsoil, installation of water bars, and drill seeding on the contour. The removal of structures such as bridges, culverts, cattleguards, and signs usually will be required. Stripped vegetation will be spread over the disturbance for nutrient recycling, where practical. Fertilization or fencing of

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these disturbances will not normally be required. Additional erosion control measures (e.g., fiber matting) and road barriers to discourage travel may be required.

### CONSTRUCTION OF WELL PADS AND FACILITIES

Prior to construction, the proposed pad location will be surveyed and staked and all erosion control design considerations will be reviewed (See Operating Order #1 for required engineering and design information).

The well pads will be laid out so that they are parallel to the contour and the pit is uphill whenever possible (H<sub>2</sub>S wells may require an exception).

The drill pads will be designed and constructed to disturb the smallest practicable area that will still provide for efficient and safe operations.

All cut and fill slopes will be staked out at least every 50' on slopes with greater than 3' cut and/or fill to identify where topsoil will be removed. Spoil storage areas also must be staked so topsoil can be stripped and stored prior to any other dirt work. All cut and fill work will be balanced to minimize excess spoil material required during pad construction.

If excess spoil exists it will have to be incorporated into the pad fill slope by compacting the spoil in six inch lifts using water and rubber tire vehicles and/or sheep's foot rollers or placed in designated areas and stabilized. The areas of the pad that will support the drill rig and any other heavy equipment will be compacted.

All precautions necessary to stabilize structures will be taken during construction.

During the construction phase, interceptor ditches will be installed above the cut, where necessary. Collector ditches and sediment control structures, designed for a 10-year/24 hr event, may be required below the fill. Water, with a flow less than the 10-year/24 hr storm event, will be diverted and/or collected before being discharged from the disturbed area.

Qualified supervision will be provided during the installation of all erosion control structures including the construction of berms, dikes, trenches and the outslope fill.

No surface disturbance is allowed on slopes in excess of 25 percent unless erosion controls can be ensured and adequate revegetation is expected. Detailed engineering proposals, revegetation and restoration plans and a site specific environmental analysis will be required in these areas.

On producing locations spoil material will be replaced as close to the original contours as the placement of production facilities allows. Operators will be required to reduce cut and fill slopes to 3:1 or less. In those areas where final spoil grading is not possible, spoil will be graded to a gentle slope capable of maintaining a temporary vegetation cover for erosion control. Terraces or elongated water breaks (erosion control measures) will be required after slope reduction. Facilities will be required to approach zero runoff from the location until the area is stabilized to avoid contamination and water quality degradation downstream. All unused portions of facilities on producing well locations will be reduced to 3:1 slopes or less, resurfaced with topsoil and seeded with soil stabilizing species. Topsoil will be taken from the storage pile and spread six inches deep onto the unused portion and chiselled on the contour.

On well pads and larger locations, special attention will be given to sections of the surface use plan covering reclamation. This plan will include objectives for successful reclamation including: soil stabilization, plant community composition, and desired vegetation density and diversity. After they are constructed, reserve pits will be evaluated to determine the need for lining.

### CONSTRUCTION AND RECLAMATION OF PIPELINES AND COMMUNICATION LINES

Existing crowned and ditched roads will be used for access where practical to minimize surface disturbances. Pipelines are to follow new or existing roads or existing buried pipelines where it is practical. The pipeline trenches will not be placed in the access road borrow ditches unless no other reasonable alternative is available.

Generally, pipelines will be laid on the surface when slopes are over 25 percent and where rock outcrops are crossed. When possible pipelines should be built perpendicular to the contour in order to minimize the amount of area required for construction.

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Clearing of pipeline and communication line rights-of-way will be accomplished with the least degree of disturbance to topsoil. Vegetation removed from the right-of-way will also be required to be spread to provide protection, nutrient recycling, and a natural seed source.

To promote soil stability, the compaction of spoil material free of vegetative material back into pipeline trenches following each lift replacement. The first lift should be 18" deep to reduce the chance of puncturing the pipeline. The rest of the lifts should be 8" deep or less. The soil berm above the pipeline trench shall not settle below the original ground surface or rise any more than 3" above it. Any areas that do not meet this requirement will have to be brought in compliance and reseeded. Water bars, mulching, and terracing will be required, as needed, to minimize erosion. Instream protection structures (e.g., drop structures) may be required in drainages crossed by a pipeline to prevent erosion.

When the need is clearly identified through an environmental analysis or monitoring studies, linear disturbances will be fenced to protect the revegetated area from damage due to domestic and wild animals and off-road vehicles.

If linear facilities follow the same right-of-way for all or part of the route, they will generally be required to be constructed so that only one reclamation effort is required. Generally, they will be required to be constructed either concurrently or during the same field season.

## GEOPHYSICAL OPERATIONS

All of the standard practices for surface disturbing operations will apply to geophysical operations. The most critical management practice is compliance monitoring during and after seismic activity. Compliance inspections during the operation ensure that stipulations are being followed. Compliance inspections upon completion of work ensure that the lines are clean and the drill holes are properly plugged.

## RECLAMATION

Reclamation will be required on all disturbed areas. On roads left intact for access purposes, the stabilization of all disturbed areas, except the running surface, will be required.

Reclamation (by the operator or grant holder) will be initiated as soon as possible after a disturbance occurs. Construction of erosion and runoff control measures and placement of topsoil will be required after recontouring. Continued efforts will be required until satisfactory vegetation cover is established and the site is stabilized.

Site-specific reclamation plans will identify and provide reclamation erosion control methods for potential surface water impact for pipeline stream crossings. Stream channels will be restored to preconstruction grade and stabilized using appropriate methods, such as riprap, gabions and bulkhead retaining walls, timber, hay bales, and silt fences.

The collection and analysis of soil samples from disturbed areas may be required as part of reclamation planning to determine appropriate seed mixtures, and nutrient deficiencies. Soil testing and reports will be the responsibility of the grantee or lessee. Testing (as determined by BLM) may include: pH, mechanical analysis, salt, exchangeable sodium percentage, nitrogen, phosphorus, and/or potassium content.

Fertilization may be required if there is evidence of a nutrient deficiency. If needed to produce adequate germination and growth, the topsoil and selected seed species would be inoculated with soil microorganisms. The site will be drill seeded or broadcast (if slopes exceed 30 percent or contain 35 percent surface rock content).

Coarse materials with large voids will be compacted or covered with fine textured spoil material prior to topsoil placement to prevent sifting of topsoil into the spoil.

Severely compacted soils will be cross-ripped to a depth of two feet with two foot centers in order to gain a more desirable seed bed.

During the operational life of a facility, (e.g. producing well, manifold, microwave tower, block valve, etc.), disturbed surface area not needed for operations will be reclaimed. This will entail spreading stockpiled spoil materials unto the areas to be reclaimed and then spreading stockpiled topsoil over the spoil. The areas will then be seeded and mulched as specified.

Stockpiled spoil will be replaced immediately after abandonment of surface facilities. Spoil and topsoil replacement will be completed at the first appropriate time during the following field season (May - October) to allow for fall seeding and mulching.

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Grading may be required to improve steep, long and/or rough slopes in preparation for seed bed manipulations and planting.

In particular, grading will be used to blend cut-and-fill slopes with adjacent undisturbed areas while minimizing slope length, improving stability, reducing runoff, and decreasing erosion. Grading will provide for uniform distribution of spoil and topsoil. Grading will be used to implement one or more of the following specialized techniques; slope rounding, bench grading, stair-step grading, contour furrowing and berm placement on top of cut or fill slopes.

Snow fences, placed to increase snowfall depth over a reclaimed area, and reshaping to create shallow depressions (to catch surface runoff) may be required in areas receiving 10 inches or less of annual precipitation.

If environmental analysis or monitoring identifies the specific need, well sites and sensitive areas along linear rights-of-way will be fenced to protect the revegetated areas from damage by domestic and wild animals and off-road vehicle use. All fences will be built in accordance with the BLM fencing manual and Wyoming State Laws on legal fencing in effect at the time of reclamation. Fences will be kept in a usable condition until reclamation has been accepted by the authorized officer. After reclamation has been approved and the fences have been removed, the authorized officer can then release the operator or grantee from any further liability.

Off-road vehicle barriers will be installed, where necessary, and will consist of boulders, pylons, brush piles or other feasible barriers as required on a site-specific basis.

### Seeding

On all areas to be reclaimed, seed mixtures will be required to be site-specific and will be required to include species promoting soil stability. Livestock palatability and wildlife habitat needs will be given consideration in seed mix formulation. Interseeding, secondary seeding, or staggered seeding may be required to accomplish revegetation objectives. During rehabilitation of areas in

important wildlife habitat, provision will be made for the establishment of native browse and forb species, if determined to be beneficial for the habitat affected.

Topsoil will be distributed uniformly on the area to be reclaimed. If there is between 2 to 3" of topsoil available for reclamation, it may be mixed with the top 3" of "acceptable" spoil prior to seeding the site. If 4" to 6" of topsoil is available no mixing will be required. Following topsoil application, seed bed preparation procedures will be determined on the basis of the physical and chemical characteristics of the topsoil and the physical nature of the site itself. A friable, but firm seed bed will be required.

Final seed bed preparation will be scheduled for completion immediately prior to seeding to maximize seeding effectiveness and seedling establishment. If top soil spreading is completed on a site during Spring and seeding is going to be delayed until fall, a suitable cover crop (an annual grass) will be broadcast seeded for stabilization and weed control.

All disturbed areas will be seeded using a drill equipped with a depth regulator. All seed will be drilled on the contour. The seed will be planted between one-quarter and one-half inches deep. Where drilling is not possible (too steep or rocky), the seed will be broadcast and the area raked or chained to cover the seed. If the seed mixture is broadcast the listed rate will be doubled. The seeding shall be repeated until a satisfactory stand, as determined by the AO, is obtained.

Each operator will submit the seed certification tags from each bag of seed used, upon request of the AO. In addition, the company will submit a list of what species were actually seeded and the actual application rate for each site.

The following are representative seed mixtures and rates that will be used. The seeding rate will generally be 12 - 15 lbs/acre. The seeding rate will be doubled if the seed is broadcast.

**SITES WITH TOPSOIL AVAILABLE:** (Soil amendments and mulch may be required.)

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- \_\_\_\_\_ A. Dry alkaline sites and shale slopes (areas with a pH between 8 and 9)  
Vegetation present: Greasewood, Shadscale, Gardner Saltbush.

Species	lbs/acre
Rosana Western Wheat	6
Pubescent Wheat	6
Winter Fat	2*
Fourwing Saltbush	1
Gardner Saltbush	1*
Tall Wheatgrass	4

### Other possibilities

Saltgrass  
Alkali Sacaton  
Russian Wildrye\*\*

\* Plant only if present in the area.

\*\* Plant on saline sites with slopes of 5% or less.

- \_\_\_\_\_ B. Dry loamy sites ( areas with a pH of 8.4 or lower and less than 12 inches of moisture). Native vegetation is commonly Wyoming big sage and thickspike wheatgrass.

Species	lbs/acre
Thickspike Wheatgrass	6
Rosana Western Wheatgrass	6
Indian Ricegrass	2
Great Basin Wild Rye	1-2
Fourwing Saltbush	1-2
Wyoming Big Sage	1-2
Winter Fat	1-2*

### Other possibilities

Blue bunch wheat grass  
Needle and Thread  
Bluebunch Wheatgrass  
Slender Wheatgrass  
Streambank Wheatgrass

3-4  
3-4

- \_\_\_\_\_ C. Loamy sites (areas with a pH of 8.4 or lower and more than 12 inches of moisture). Vegetation is usually Needle and Thread, Thickspike, Bluebunch Wheatgrass, and Wyoming Big Sagebrush.

Species	lbs/acre
Thickspike Wheatgrass	6
Smooth brome	6
Pubescent wheatgrass	1
Blue Bunch wheatgrass	1-2
Stream Bank wheatgrass	1-2
Wyoming Big Sage	1-2
Intermediate Wheatgrass	1-2
BitterBrush	1-2
Snowberry	1-2*

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\_\_\_\_\_ D. Mountain Shrub - deep loamy soils with 14 - 18 inches of moisture.

Species	lbs/acre
Smooth Brome	5
Intermediate Wheatgrass	4
Slender Wheatgrass	2
Big Bluegrass	1
Mountain Brome	2
Blue Bunch Wheatgrass	1
Basin Wild Rye	1
Mountain Mahogany	1-2
Service Berry	1-2
Bitter Brush	1-2

\_\_\_\_\_ E. Aspen Conifer - higher areas or north facing slopes with 16 - 20 inches of moisture.

Species	lbs/acre
Smooth Brome	6
Slender wheatgrass	2
Orchard Grass	2
Timothy	2
Alpine Timothy	1
Intermediate Wheat	2
Meadow Foxtail	1
Sticky Geranium	1

**SITES WITHOUT TOPSOIL AVAILABLE OR WITH HIGH SALINITY:** (Soil tests required prior to seeding and added soil amendments will be required in most cases.)

\_\_\_\_\_ A. Moderate pH and Salinity.

Species	lbs/acre
Crested Wheatgrass	12-15
Slender wheatgrass	3
Smooth Brome grass	2
Streambank wheatgrass	2

\_\_\_\_\_ B. Highly saline sites (EC=10 or greater). Species listed in accordance with their ability to tolerate high salinity. (Other soil amendments will be required in most cases.)

Species:	lbs/acre
Tall Wheatgrass	6
Slender wheatgrass	6
Tall Fescue	6
Western Wheatgrass	6
Russian Wildrye	12*

\*Seed alone and on slopes less than 5%.

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Follow-up soil testing and/or seeding or corrective erosion control measures will be required on areas of surface disturbance which experience reclamation and/or erosion failure.

### Treatments

Mulches will be applied on seed beds with high soil erosion potential or where seed bed microclimate may limit seedling establishment. Any mulch used will be free from mold, fungi, or noxious weed seeds. Mulch may include native hay, small grain straw, wood fiber, live mulch, cotton, jute, synthetic netting, and rock. Straw mulch should contain fibers long enough to facilitate crimping and provide the greatest cover. Some type of matting may be required in more severe conditions such as steep slopes, sandy soils, and other poor soil sites which need site condition modifications to enhance seeding success.

The grantee or lessee will be responsible for the control of all noxious weed infestations on surface disturbances. Control measures will adhere to those allowed in the Rock Springs District Noxious Weed Control EA (USDI 1982a) or the Regional Northwest Area Noxious Weed Control Program EIS (USDI 1987).

Ripping and chiseling will be used to break up compacted soils, increase water penetration, promote root growth, and control erosion. Ripping (2' deep) will normally be used on compacted spoil material and old road beds prior to spreading topsoil. Chiseling on the contour (12" deep) will be done after the site is contoured, ripped, the topsoil is spread, and soil amendments are added.

On sites where quick establishment of shrub and/or small tree species is desirable, bare rooted and containerized species will be hand planted to supplement drilling or broadcast seeding. Shrub species will be planted in areas where wildlife forage is essential, mass slope failure is possible, or along stream crossing to facilitate site stability and wildlife habitat restoration.

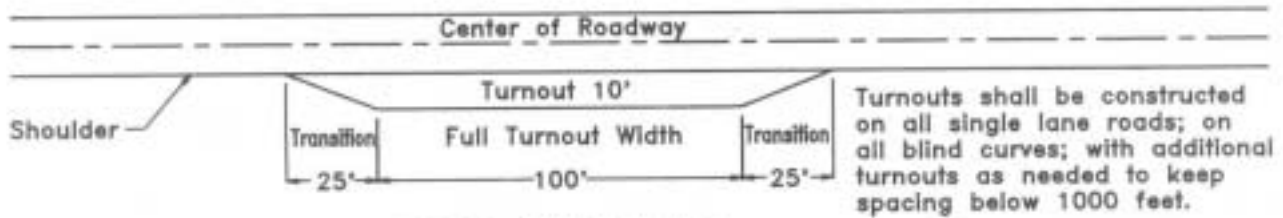
Hydroseeding may be required on steep, gravelly slopes which require the seed to be "anchored" onto the soil surface prior to a mulch treatment. Care will be taken to assure that the solution is not harmful to the seed mix components.

### AIR QUALITY PROTECTION MEASURES

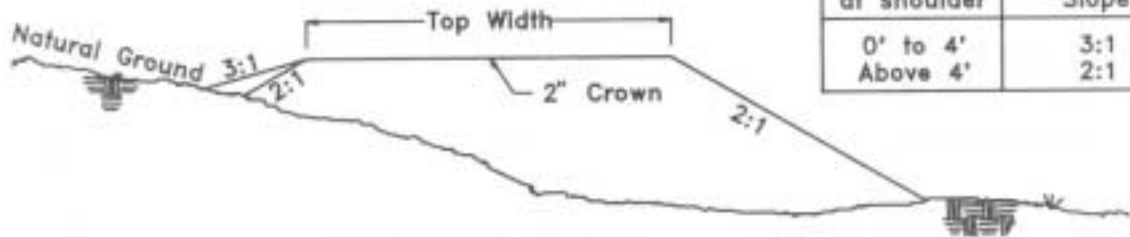
As projects are planned that include possible major sources of air pollutant emissions, special air quality protection related stipulations are added to BLM permits and rights-of-way grants. In addition, the BLM coordinates with the Wyoming Department of Environmental Quality/Air Quality Division (DEQ/AQD) during the process of analysis that may lead to the issuance of permits to construct emission sources. This coordination often results in the technical review of applications for permits and/or identification of additional stipulations to be applied to these permits.

The release of hazardous air contaminants, particularly the emissions from sour natural gas sweetening plants (a process used to remove H<sub>2</sub>S from natural gas resulting in the emission of sulfur dioxide), is a public concern. BLM requires industry to prepare detailed analyses of risks involved with the development of sour gas pipelines and treatment facilities. These analyses are designed to project impacts both to the public and to resource values. Plant siting will be scrutinized to provide for public safety and to ensure that only areas with the least potential for the transport of pollutants to the wilderness are considered.

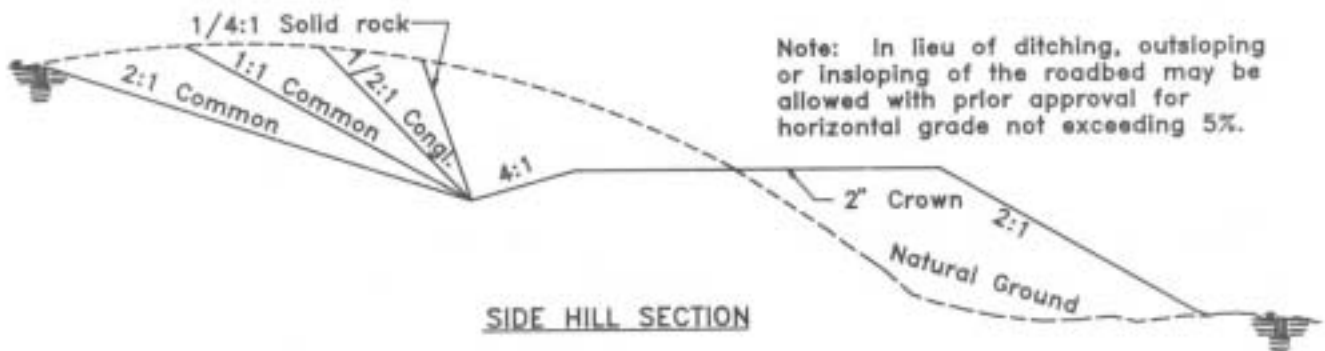
To aid in achieving these goals, BLM will consult with the State of Wyoming, the U.S. Forest Service, industry, and the public to ensure that the most technically sound, environmentally balanced, and economically feasible decisions are made.



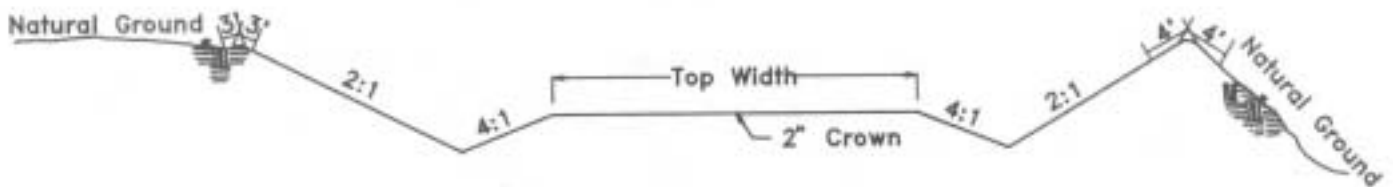
TYPICAL TURNOUT PLAN



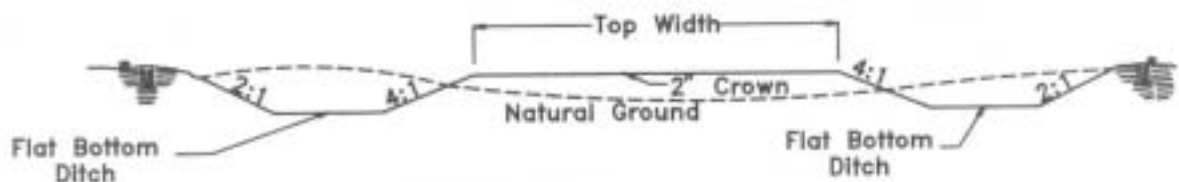
EMBANKMENT SECTION



SIDE HILL SECTION



CUT SLOPE ROUNDING



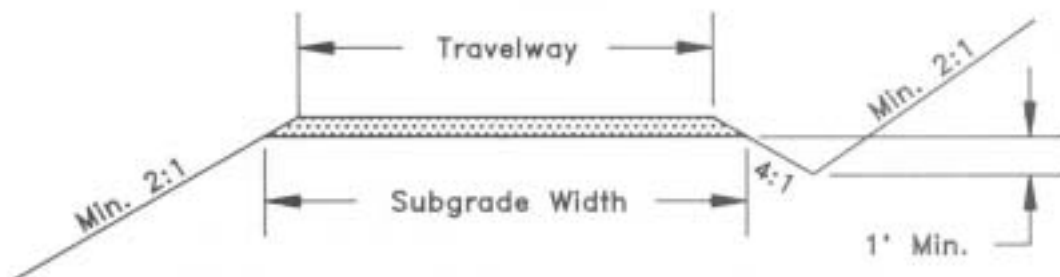
FLAT BOTTOM DITCH

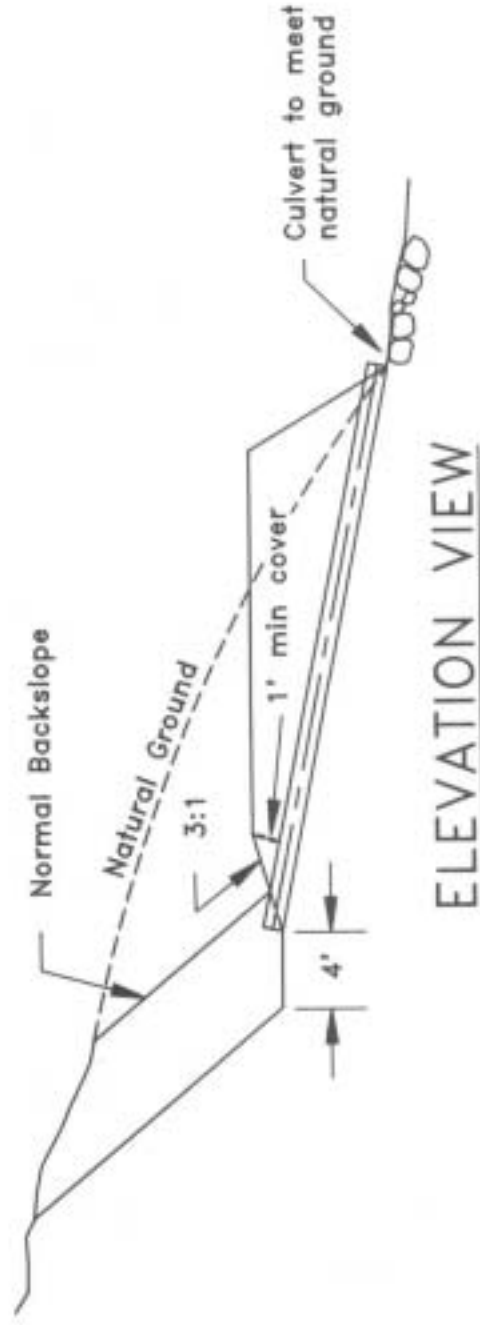
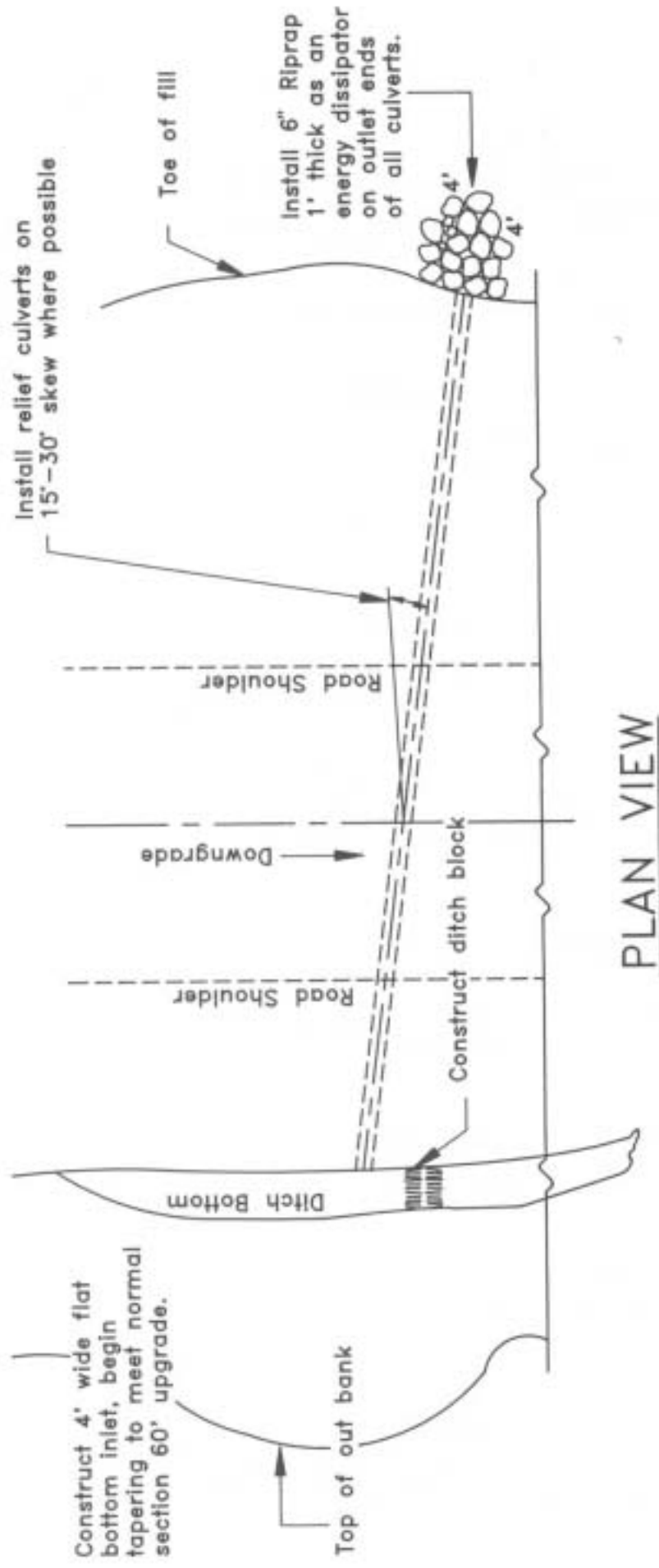
## TYPICAL ROAD SECTION

# MINIMUM ROAD STANDARDS

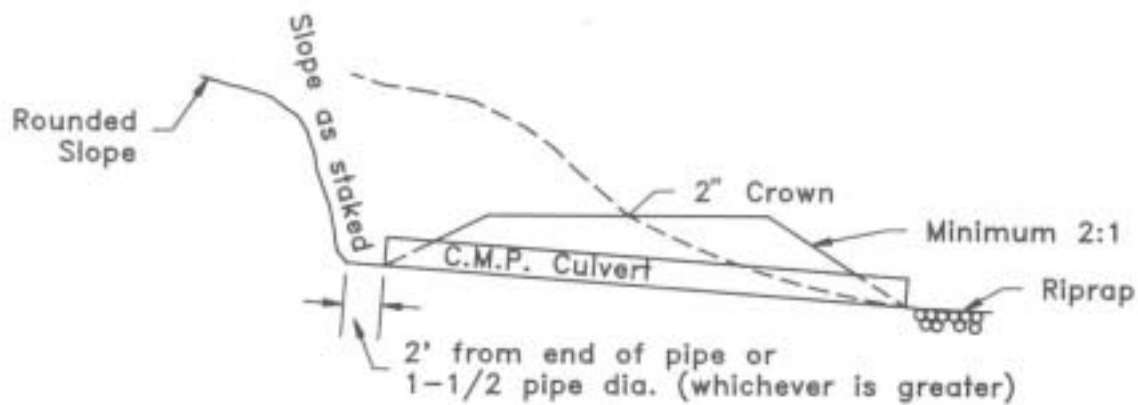
	<u>Single Lane</u>	<u>Double Lane</u>
Width – subgrade	16' (with turnouts)	24'
Average Design Speed	15–25 m.p.h.	25–35 m.p.h.
Maximum Grade	10% *	10% *
Minimum Radius (feet)	65	100
Normal Cut Slope (back slope)	2:1	2:1
Normal Fill Slope	3:1	3:1
Normal Ditch (one foot deep)	4:1	4:1

- \* Any grade above 8% requires a complete engineering analysis.  
An engineering analysis is required for all roads.

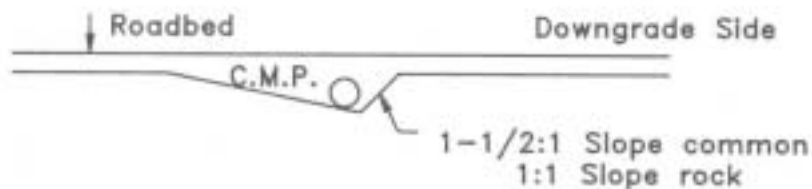




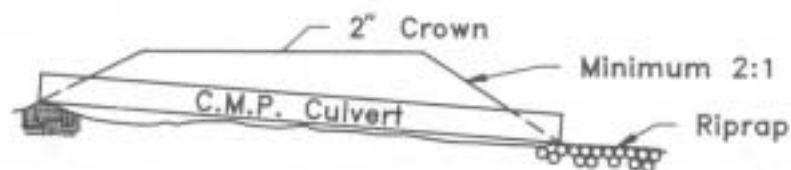
# CROSS DRAIN



### C.M.P. CULVERT INSTALLATION CUT SECTION



### C.M.P. CULVERT INSTALLATION DITCH CONSTRUCTION AT SIDE HILL

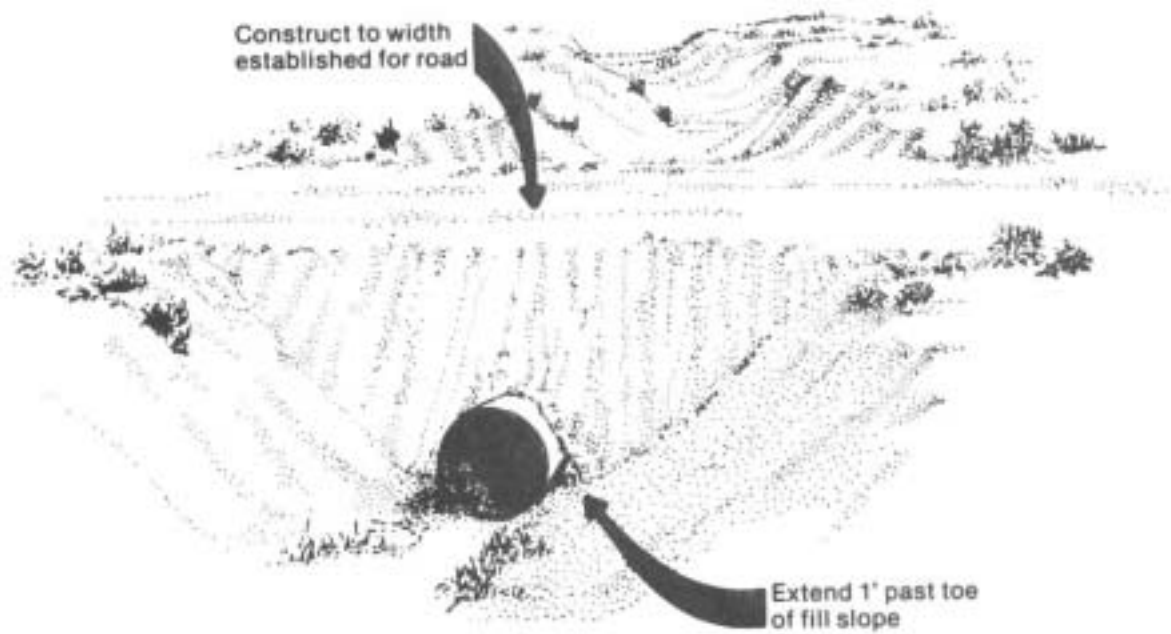


### C.M.P. CULVERT INSTALLATION EMBANKMENT SECTION

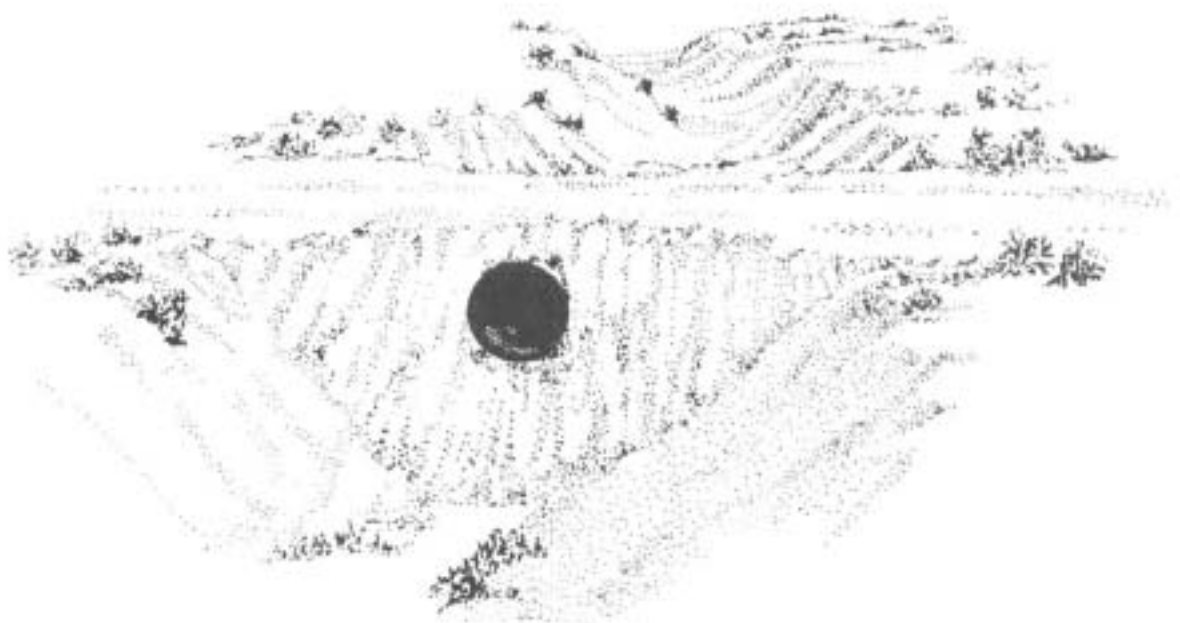
#### General Notes:

1. In bedding of C.M.P. culverts, if the foundation is rock, excavate to depth of 8 in. below culvert grade and replace with earth cushion.
2. Minimum cover over culvert is 1'.
3. Minimum culvert diameter 18".
4. Minimum culvert spacing:
  - (a) 1- 2% grade - 1000 feet minimum
  - (b) 2- 4% grade - 800 feet minimum
  - (c) 4- 6% grade - 600 feet minimum
  - (d) 6- 8% grade - 400 feet minimum
  - (e) 8-10% grade - 250 feet minimum
5. Maximum grade 10%.

TYPICAL CULVERT  
CONSTRUCTION



ACCEPTABLE



NOT ACCEPTABLE